

WHAT IS CLAIMED IS:

1. An injection molding system configured to make molded parts, comprising:
one or more nozzles having at least one flat outer surface; and
a releaseably securable patterned planar heater device coupled to the at least one flat outer surface of the one or more flat nozzles.
2. The system of claim 1, wherein the planar heater device comprises an electrical resistive path patterned on a support device.
3. The system of claim 2, wherein the support device comprises a dielectric support device.
4. The system of claim 2, wherein the patterned resistive path is configured to generate a longitudinal uniform heat profile along a melt flow channel.
5. The system of claim 1, wherein the one or more nozzles comprise one or more injection molding nozzles.
6. The system of claim 1, wherein the heater device comprises one or more individual planar heaters coupled to individual ones of the one or more nozzles.
7. The system of claim 1, wherein the heater device comprises one or more individual planar heaters coupled to one or more sections of individual ones of the one or more nozzles.

8. The system of claim 1, wherein the planar heater device is coupled to a side of the one or more nozzles.

9. The system of claim 1, wherein the planar heater device comprises:

a first portion coupled to a first side of the one or more nozzles;

and

a second portion coupled to a second, opposite side of the one or more nozzles.

10. The system of claim 1, wherein the planar heater device comprises:

a first portion coupled to a head portion of the one or more nozzles; and

a second portion coupled to a body portion of the one or more nozzles.

11. The system of claim 1, wherein the planar heater device comprises:

first and second portions coupled to opposite sides of a head portion of the one or more nozzles; and

third and fourth portions coupled to opposite sides of a body portion of the one or more nozzles.

12. The system of claim 1, wherein the planar heater device comprises a rigid planar heater.

13. The system of claim 1, wherein the planar heater device comprises a flexible planar heater.

14. The system of claim 1, wherein the planar heater device comprises a film heater.

15. The system of claim 1, wherein the planar heater device is configured to be visually inspected for defects.

16. The system of claim 1, wherein the one or more nozzles comprises one or more flat micro nozzles.

17. The system of claim 1, wherein the one or more nozzles comprise at least one flat outer surface and one curved outer surface.

18. The system of claim 1, wherein the one or more nozzles comprise a square cross-section.

19. The system of claim 1, wherein the one or more nozzles comprise a rectangular cross-section.

20. The system of claim 1, wherein the one or more nozzles comprise a triangular cross-section.

21. The system of claim 1, wherein the planar heater device comprises one of a flexible or rigid film heater.

22. The system of claim 21, wherein the film heater comprises one of a thick film heater and a thin film heater.

23. A method configure to heat a nozzle during injection molding, comprising:

producing a sheet including one or more patterned planar heater devices;

removing a portion of the sheet corresponding to a size of one or more flat nozzles; and

releasably coupling the portion of the sheet to the one or more nozzles having at least one flat surface.

24. The method of claim 23, further comprising:

patterning an electrical resistive path on each of the one or more patterned planar heater devices.

25. The method of claim 24, further comprising:

using the electrical resistive path to generate a longitudinal uniform heat profile along a melt flow channel of the one or more flat nozzles.